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Contents

Internet based lessons learned project provides first hand assistance prior to deployments

By Larry D. McCaskill
Research, Development and Engineering Command Public Communications Office

Maj. Raymond Compton discusses the merits of an asymmetrical training program to Secretary of the Army Dr. Francis J. Harvey during a visit to the U.S. Army SFC Paul Ray Smith Simulation, Training and Technology Center recently.
(Photo courtesy of U.S. Army)

Personnel at the U.S. Army SFC Paul Ray Smith Simulation, Training and Technology Center, Orlando, Fla., recently conducted a demonstration for the Secretary of the Army Dr. Francis J. Harvey, of progressing technologies that will assist in the training of units preparing for war far more effectively that the formal lessons learned.

A subordinate unit of the U.S. Army Research, Development and Engineering Command, STTC is developing an asymmetric training tool that enables units in an area of operation to reach back to units preparing to deploy and provide real time information such as up-to-the-minute review of the geographical footprint the incoming unit will be responsible for.

“We received a request from members of the Army Science Board, after we demonstrated the technology at one of their meetings, to brief the Secretary of the Army,” said Maj. Ray Compton, STTC’s director of military operations. “Members of the board felt the technology could help resolve a training gap that had been previously identified by secretary.”

“This technology can assist soon-to-be deployed units with identifying concerns about their upcoming mission from those currently on site," Compton said. “It’s a super tool that will help units get those lessons learned from the Soldiers on the ground. The input can be provided instantly and would cut some of the training time in half.”

“What you are talking about is a booming technology that will one day spread across the entire Army,” said Neale Cosby, chairman of the Army Science Board’s Operations, Training and Education Panel.

The training advantages the technology offers could not have come at a better time.

“We’re asking green lieutenants who are a year out of college to take charge of a platoon of Soldiers to do some dirty work,” Cosby said referring to fighting in combat. “We have to figure out a way to help (train) these guys.”

The voice-over the internet training, an element within the asymmetrical training, allows the Soldier to receive multiple levels of information, audio and visual, Cosby said.

“The technology is the basis for wonderful training opportunities and will assist in providing learning capabilities we never dreamed of,” he said.

“The technology provides the capability for individuals all over the world to interact in a common virtual environment via the Internet, said Jeff Stahl, a principle investigator in STTC. “The intent of the research program is to determine if this game-based technology can be leveraged to provide effective military training against asymmetric warfare.”

The simulation environment can be used to quickly recreate situations in realistic geo-typical neighborhoods within the area of operations that include multiple participants such as Army units, non-combatants, local military and police, coalition forces and the enemy.

“Our vision is that Army leaders in the area of operations would design asymmetric warfare scenarios based on their recent combat experience ,” Stahl said. “Using the internet, they would then be able to assist in the conduct of those training exercises with CONUS-based units preparing for deployment. We believe these simulation exercises, with the after action reviews, can then be provided to the Center for Army Lessons Learned and can be accessed by other CONUS-based units.”

These simulation exercises are a possible improvement over written lessons learned that will better prepare combat forces to conduct operations immediately upon arrival in the AOR, Stahl said. The most powerful element of the technology is it will allow the CONUS-based units to practice their tactics, techniques, and procedures against an opposing force role-played by Army leaders in-theater that have first hand knowledge of the enemy tactics of today because they just fought the real battle.

“By adding locals as role players (terrorists, non-combatants, and government officials), the simulation will allow training on non-traditional battle tasks such as negotiations, cultural aspects when interacting with the local population, identification of improvised explosive devices and shoot/don't shoot decision-making when non-combatants are involved," Stahl said.

Compton agreed that the technology could also help ease the pressure Soldiers may have in adjusting to the many cultural differences that comes with deploying overseas.

“Dealing with things as such as a foreign language and the other sensitivities can be difficult on a Soldier. This technology can reduce some of the stress by letting those ready to deploy observe it first hand and address some of the issues they are worried about before going into theater,” he said.

After spending 90 days working on the training concept, the STTC team was confident they had created scenarios realistic enough to put the technology into action and push its limit.

The purpose of the simulated exercise was to show how a battalion could conduct training on a search and cordon mission per Army training evaluations program standards. The simulation intent was to ensure the battalion would be ready to operate under established conditions in an area of operations based on lessons learned from actual and simulated combat experiences.

“This training provides real experiences in a simulated setting,“said Staff Sgt. Howard Hizer, noncommissioned officer-in-charge during the training event and a combat veteran from operations in Iraq .

“This type of training exposes Soldiers to experiences they will see in theater well in advance and should ease some of their concerns as well as help with their orientation.”

To create as real as possible training environment, teams at locations spread across the United States and networked through a distributed environment worked their way through various challenges ranging from evacuating a Soldier wounded in action to conducting an after action review to responding to a hostage and direct action event.

Each “unit” worked through the scenarios, reacting to each twist and turn.

“We had numerous nodes on line working and everyone was fully engaged,” said Michelle Mayo, a principal investigator with STTC who served as an operational controller during the exercise. “Overall interest in this technology has increased over the last year and we are constantly working to move it forward. “

The internet-based technology is accessible to those who are part of a “distinctive network,” according to Mayo. One of the attractive features of the technology is its ability to conduct training at many different levels.

“A platoon in Baghdad can transmit its training real time to numerous locations where a variety of squads stateside or world wide can view and participate. Its application is very relevant for today’s operations. We have people working on the improvised explosive device task force who are interested in seeing how they may be able to use the technology now,” Mayo said.

"The simulation prototype supports a wide range of training audiences that includes combat, combat support, and combat service support for both the Active Army and Resrve Component," Compton said. "Basically, the simulation supports any platoon level element conducting asymmetric warfare missions such as those currently employed today."

"Our next step is to determine the training effectiveness of the simulation by conducting platoon level training exercises," said Rodney Long, a science and technology manager in STTC. "We are also coordinating with active Army divisions to determine their interest in using the simulation for training."

"This technology doesn't take the place of the way we currently train. This technology, melded with tabletop exercises and other forms of training can maximize the training opportunity," Compton said.

Army-Navy team provides water for Biloxi, Miss. hospital

By Paul D. Mehney & Susan Pierchala
Tank Automotive Research, Development and Engineering Center

The Army-Navy EUWP is being used to supply potable water to the Biloxi Regional Medical Center
(Courtesy photo)

A hospital in the United States of America without running water was hardly imaginable one month ago. It is reality now. When Hurricane Katrina slammed into the Biloxi region August 29, 2005, it did not differentiate between hospitals or hotels. Destruction was swift and complete.

“Immediately after the hurricane struck, we were without any clean potable water for drinking, cleaning or surgical tasks,” said, Darrin Ivey, Biloxi Regional Medical Center facilities manager. To make matters worse injured and displaced residents were streaming in for medical care. Soon Federal Emergency Management Agency dispatched dozens of tanker trucks to the location with thousands of gallons of clean water, but it was not enough.

“For a few days, we didn’t have water at all,” said Lori Derouen with Biloxi Regional.

“When we finally were able to get water running in the building, it wasn’t potable. We’ve had to boil everything to cook the food. We’re using bottled water, sanitizer to rewash our hands.” Derouen said.

Sitting on the Gulf of Mexico, Biloxi, once one of nation’s largest exporters of raw oysters could not use the very water that once sustained it. September 4, FEMA acted sending a request to the Office of Naval Research, Arlington, Va., to release two Expeditionary Unit Water Purifiers - a program still in research and development. Although one EUWP was located at a Bureau of Reclamation site in New Mexico and another in California, Rear Adm. Jay M. Cohen, commander of ONR ordered them sent with all possible speed to Mississippi.

Under FEMA direction, one unit was immediately slated to provide potable water to the Biloxi Medical Center and another one dispatched to a site in Pascagoula, Miss. Four BoR researchers volunteered to stay with and operate the Biloxi unit. As he was leaving for Biloxi, BoR project manager John Walp said, “We’ll be cleaning up the water and we’re glad to do this, we are really proud to provide Katrina relief.”

A jointly developed program between ONR and the Tank Automotive Research, Development and Engineering Center with testing performed by the BoR, the EUWP is capable of supplying potable water from virtually any water source, including nuclear, biological and chemical contaminated sources.

Originally designed to support large military units during deployment and sustainment operations but now being used for disaster relief, each EUWP can produce up to 100,000 gallons of water per day form seawater or 200,000 gallons from freshwater.

The EUWP consists of two separate ISO configured platforms that are compatible with the military’s Palletized Load System trucks and most commercial line haul transports. The system uses ultrafiltration to process freshwater and reverse osmosis technology to filter seawater. Using large water bladders the EUWP can store up to 40,000 gallons of

potable water and is powered by a 60-kilowatt diesel generator.

Each EUWP produces upto 100,000 gallons of water per day from seawater or 200,000 gallons from feshwater.

"The whole system is self-contained. All we need is diesel fuel to operate. Although this system is still in a research and development phase, it was proven that we can respond in a matter of days, set up in a couple of hours and generate potable water," according to Drew Downing, TARDEC program engineer.

The first EUWP arrived in Biloxi September 7 and TARDEC engineers working with Bureau of Reclamation staff were, within a matter of hours, able to begin converting Gulf Coast seawater directly to potable water. To get the water from the EUWP to the hospital proved more of a challenge than decontamination. With help from hospital staff and Mississippi Department of Transportation personnel, a system of PVC pipe was installed to reach the hospital, a full three uphill blocks off the coast where the unit was positioned. This included laying a pipeline under US-90 was not a small engineering feat considering most of the road was destroyed.

After a system flush and testing by the U.S. Health Service and the Mississippi Department of Health, water was soon flowing to the hospital "No one on this end of town has potable water. TARDEC's EUWP has given us the ability to have water. Without it, everything was reduced from surgery to food preparation to hygiene – and we are still very busy," Ivey said.

The medical center is now consuming more than 2,900 gallons of EUWP provided water per hour.

Troops could have new Picatinny-developed smart artillery munition by March

By Frank Misurelli
Picatinny Public Affairs

A Paladin similar to this M-109A6 fired a guided Excalibur projectile a distance of 15 kilometers Sept. 15 at Yuma Proving Ground, Ariz. The XM982 round detonated within 7 meters of its target. (Courtesy photo.)

U.S. military troops in Iraq and Afghanistan could have a significantly more accurate howitzer-fired munition by March, following successful demonstration of the Army's first fully autonomous guided projectile, Excalibur, at Yuma Proving Ground, Ariz., Sept. 15.

Officials from the Army Project Manager for Combat Ammunition Systems located at Picatinny say the 155mm guided Excalibur round, known as the XM982, is more accurate than any currently available. A total of 165 Excalibur rounds have been contracted for $23 million.

A special team headquartered here is managing the development effort.

The demonstration brings the program a step closer toward fulfilling an urgent request to put Excalibur in Soldier's hands by early 2006.

The projectile's accuracy is better than 10 meters, officials said, a figure that represents a huge improvement over existing munitions. Excalibur will be used in Army and Marine Corps howitzers, to include the M109A6 Paladin, the M777 Lightweight 155 Howitzer and the Future Combat Systems Non-Line Of Sight Cannon.

"Excalibur will reduce collateral damage, increase survivability of friendly troops and accomplish the mission more efficiently," said Col. Ole Knudson, the project manager who oversees Army combat ammunition development programs.

Knudsen called the Sept. 15 demonstration "a tremendous success."

"Excalibur has been proven at the system level to meet its precision and lethality objectives," he said.

The demonstration consisted of firing an Excalibur projectile from a Paladin 155mm self-propelled howitzer at a target 15 kilometers away.

Eyewitnesses said the munition detonated successfully within seven meters of the target.

The round was set to activate in "height of burst" mode using an enhanced portable inductive artillery fuze setter.

During flight, the projectile "de-rolled" successfully, deployed canards, acquired GPS signals, calculated the navigation solution and maneuvered itself to the target, which it then destroyed.

The demonstration brings the program a step closer toward fulfilling an urgent request to put Excalibur in Soldiers' hands by early 2006.

A cooperative effort between the United States and Sweden, the program is managed by the Program Executive Office for Ammunition with the support of the U. S. Army Armament Research, Development and Engineering Center.

Army demonstrates Future Combat Systems

By Steve Harding
Soldiers Magazine

An unmanned aerial vehicle operator prepares the Class I UAV for takeoff during the Future Combat Systems demonstration Sept. 21 at Aberdeen Proving Ground, Md. The UAV is man-portable, and can be fitted with a variety of sensor packages. (Photo by Steve Harding)

The Army initiative to transition to a new modular force took a step forward last week with the first comprehensive public demonstration of several Future Combat Systems technologies at Aberdeen Proving Ground, Md

The demonstrations included flights of unmanned aerial vehicles, live firings of the 120mm Breach-Loaded Mortar, 120mm Light-Weight Cannon and, via video feed from Yuma Proving Ground, Ariz., the 155mm Non-Line-of-Sight Cannon.

The events also included in-the-field demonstrations of the Stryker Leader-Follower, the Small Unmanned Ground Vehicle and the Manned Ground Vehicle Chassis Testbed.

Reporters, congressional staffers and senior military and industry leaders watched the demonstrations Sept. 21. They also viewed static displays that included the Non-Line-of-Sight Launch System, Intelligent Munitions System and Unattended Ground Sensors, among others.

'No longer just drawing-board concept'

The systems showed the lethal power, speed and survivability capable of supporting a modular force of 43 brigades, designed to rapidly deploy for any combat operation, officials said.

In his remarks to reporters, Army Secretary Dr. Francis J. Harvey said the presentations of FCS component systems were "a clear demonstration that the Future Combat Systems program is no longer just a drawing-board concept."

And while Harvey noted that the combination of the Army's modular-force initiative and the FCS program forms the basis of the service's future-combat-force strategy, he pointed out that FCS is not being implemented solely to equip a future force.

Army spiraling FCS technologies

"The Army is taking full advantage of FCS technologies as they are developed in the near term, and expeditiously putting them into the hands of Soldiers," Harvey said. "We are inserting advances in active protection, networking, unattended sensors, precision munitions, and unmanned aerial and ground vehicles into the current force as soon as they are ready."

One of the most impressive demonstrations at Aberdeen, judging by guests' enthusiastic response, was that of the unmanned RQ-8 Fire Scout UAV. The diminutive helicopter took off, flew a pre-set search pattern over APG's Phillips Army Airfield and then landed, all by remote control. Built by Northrop Grumman Corp., the Fire Scout can carry a variety of sensors, and is currently under joint operational testing by both the Army and Navy.

iRobot awes crowd

Equally popular with onlookers was the Packbot Explorer, built by iRobot Corp. of Burlington, Mass. Compact and man-portable, the small tracked vehicle is an outgrowth of earlier variants that are already in service in both Afghanistan and Iraq.

Remotely guided by a technician, the small camera-carrying robot demonstrated its ability to climb stairs, maneuver over and around obstacles, and flip itself back upright after taking a tumble. Company representatives also displayed larger variants capable of carrying a broader range of sensors.

Ground vehicle shows speed, agility

At the other end of the FCS size spectrum is the Manned Ground Vehicle Chassis Testbed, which demonstrated its agility and speed during circuits of a small test track at APG's Perryman Test Range. A small vehicle with a very low silhouette and an innovative — and quiet — track system, the MGV is the developmental prototype of the common platform for FCS's eight manned vehicle types, including both the Non-Line-of-Sight Cannon and Non-Line-of-Sight Mortar.

The prototype platform is lighter and faster than vehicles it is meant to replace, giving the modular force the capability to quickly deploy to any trouble spot with equipment that is agile and lethal on the ground.

NLOS Cannon shows firepower

During firepower demonstrations, participants viewed live-firings of the Non-Line-of-Sight Cannon and Non-Line-of-Sight Mortar via a video link.

Mounted in a turret similar to the one intended for the fielded system, the breach-loaded mortar fired several rounds in quick succession. The Non-Line-of-Sight Cannon also fired several times, though from a much greater remove — it was firing at Yuma Proving Ground in Arizona.

Among the static displays drawing the most attention from visitors was the Non-Line-of-Sight Launch System, a joint venture of Lockheed Martin and Raytheon. Essentially a multiple-launch rocket system in a small, portable container, each NLOS-LS contains 15 vertical-launch rounds. The containers also house tactical fire-control electronics and software for remote and unmanned operations.

Sensor network to link battlefield

"What we've seen demonstrated here is nothing less than the future of ground combat," said Army Chief of Staff Gen. Peter J. Schoomaker during a post-demonstration news conference. "These systems, and the technologies they incorporate, will allow the Army to remain the world's dominant land power well into the 21st century."

The delivery of the first FCS systems will mark the introduction of the next-generation of combat systems and sensors, and of a network that will for the first time link all the sensor pictures gathered across the modern battlefield, said Brig. Gen. Charles Cartwright, the Army's unit-of-action program manager.

What that means for Soldiers and joint forces, he said, is that all units and all systems at virtually every level will benefit from vastly greater situational awareness and coordination of operation planning and execution.

FCS purpose: support modular forces

As impressive as the FCS demonstrations were, their demonstrators were quick to point out that the FCS program supports the Army's larger vision of building modular forces that will play a key role in joint operations.

"The overall purpose of the FCS family of systems is, quite simply, to provide an organization that is mobile, agile and protected, and which provides the joint combatant commander a multitude of options that he doesn't have today," said Al Resnick, director of requirements integration at U.S. Army Training and Doctrine Command.

"If you go back and look at the Army's mission-needs statement when it started down the path toward FCS, you see that the Army had — and still has — a critical need to be able to take units, like brigades, anywhere at any time and have them be combat-capable when they get there," said retired Lt. Gen. Dan Zanini, the FCS deputy program manager for SAIC, Inc., which, with Boeing, is lead FCS system integrator. "The Army also needs the ability to dominate across the full range of military operations, from peacekeeping to full-out combat, and FCS will allow it to do that."

Team effort keeps FCS on schedule

The 18 platforms that make up the FCS family of systems are the work of some 23 prime and more than 345 other contractors, a communal effort that Cartwright called the basis of the program's continuing success.

"The best of American industry is involved in this program," he said. "Every major Department of Defense contractor is part of this program, and they're all pulling together as a team."

One of those team members, Boeing Company FCS Program Manager Dennis Muilenburg, noted in remarks to reporters that "the major proof of that teamwork is that we are 27 months into a complex systems-development demonstration phase, and we are right on cost, right on schedule and meeting all the performance requirements."

Fielding to be staggered

Staying on schedule is important, Cartwright noted, since the Army intends to field each of the FCS constituent systems as it becomes ready.

"The Army is converting all its units to a modular organization," Cartwright said. "To be complete, that organizational design is waiting for the FCS systems and technologies to be delivered to the warfighters. The Army chief of staff asked us not to wait until the end of the program to deliver all the systems, but to deliver the technologies as they became available because the organizational design was already in place."

Systems already saving lives

Schoomaker pointed out that FCS-generated technologies — most notably the portable Packbot robot — are already saving Soldiers lives in Afghanistan and Iraq. "Spinning out" other technologies as they mature will both enhance current-force units' combat capabilities and reduce Soldiers' risks, he said.

Harvey said the insertion of selected FCS technologies into the current force, coupled with the ongoing development and fielding of FCS's range of constituent systems, will allow the Army to confront and defeat a learning, adaptive enemy across the entire range of military operations.

"Our modular formations, continuously enhanced by the insertion of FCS technologies, will ensure our Soldiers and leaders have the capabilities they need to win decisively when and where the nation calls," he said.

Harvey: FCS funding vital

Given the vital importance of FCS to the Army's current and future capabilities, Harvey said, "it is critical that we keep the FCS program intact, and that it is not fragmented with the associated changes in funding."

Reductions in FCS funding could jeopardize the Army's combat capabilities, he said.

"Modernizing without the complete FCS program complicates management, could sacrifice capabilities, decreases integration and increases costs," Harvey said. "Ultimately, changes to the program will cause greater development and life-cycle costs, and will push full fielding of the FCS further down the road at a time when our Soldiers need it most."

Restructuring reduces costs

Schoomaker added that a restructuring of FCS last year reduced the program's cost from $34 billion to $25 billion, and that over the past several years the Army has terminated some 120 other programs to free up funding for FCS and help move the current force into brigade-based modular units.

"The fact of the matter is the nation's got to invest in its Army and it's got to do it on the strategic timelines that are required to develop and present these capabilities," Schoomaker said. "Can we afford not to do it?"

Crossing borders in search of technology today

By Larry D. McCaskill
U.S. Army Research Development and Engineering Command Public Communications Office

It's an old adage and an even older philosophy: Why reinvent the wheel? In today's global environment of research and development, the same can be said of technology.

In an effort to leverage global technology, the U.S. Army Research, Development and Engineering Command has opened the technological boundaries between the command and the world through its International Technology Centers.

"The mission of the ITCs is to search for technologies currently available in overseas markets that can benefit and enhance Army capabilities," said Brig. Gen. R. Mark Brown, RDECOM deputy commanding general, Systems of Systems Integration. "What we are doing is creating a technology marketplace external from our technology base."

In doing so SOSI is introducing technology from non-traditional areas into the U.S. Army technology base.

"A mechanism was needed for gleaning potential science and technology opportunities from all sources outside of RDECOM," said Michael J. Dudley, director of SOSI's International, Interagency, Industrial and Academia Directorate (3IA) Dudley's 3IA directorate has the responsibility of overseeing technology center operations.

"Our mission is to help identify and leverage critical, cost-effective, technology initiatives from outside RDECOM to meet Army needs."

There are nine Army ITCs worldwide located in Canada, Germany, France, the United Kingdom, Argentina, Japan, Australia, Singapore and Chile. Brown said there are other locations, i.e. China, Russia, Brazil and others, where the possibility of discovering technology the Army could leverage is high.

"We want to go places where we will find technology that will help maximize the research and development budgets we operate under," he said.

Currently, the centers are in the best locations to fulfill the mission, according to Lt. Col. James S. Gigrich, military deputy, 3IA.

"To achieve and support the current and future force, we must develop and evolve a robust ability to identify, acquire, and integrate critical technologies available from international sources into weapon systems," Gigrich said. "While the task is complex, the rewards are great. International armaments cooperation has the potential to significantly improve interoperability for coalition warfare, to leverage scarce program resources and to obtain the most advanced, state-of-the-art technology from the technology and industrial base."

Keeping in mind the three mission areas; the current fight, the current force and the future force, Dudley said it's vital the Army maintain a balance between the three without sacrificing one for another as it looks at available technologies.

"It's beneficial to the Army to gain and maintain access to the best global technologies available, said Craig Hunter, deputy assistant secretary of the Army for defense exports and cooperation.

"By doing so, the Army can best maintain its technological superiority and at the same time prevent technological surprise on the battlefield."

"Locating existing technology also reduces research, development, production and support costs through shared resources and economies of scale. The ITCs are able to build relationships and serve as a liaison with industries, labs

and academia. In doing their mission they are able to find and link basic and applied research to the various Army laboratories and research centers that further the Army's transformation. Their role is vital as they also serve as the Army's acquisition, logistic and technology in-country representative," Hunter said.

The concept of international offices dates as far back as 1948 when the Army staffed an office in the United Kingdom to foster post World War II cooperation Gigrich said.

ITC members reduce the cost in researching existing technologies by providing initial assessments of potential technologies, sometimes saving research laboratories time, travel and expenses. When reviewing the technologies abroad, the ITCs look for innovations that provide tangible and intangible returns on investment.

"The return on investment for the ITCs cannot be measured by just the cost savings/avoidance to the U.S., but must include the relationships, access to facilities and other time savings which occur through the help of our ITCs," Gigrich said.

"The ITCs are also instrumental in determining the best foreign agencies to assist in filling requirements and linking scientists and engineers from those organizations to the U.S. technical experts to maximize our benefits. However, the most tangible measurement of cost savings is through international agreements. These agreements have saved the U.S. $32 million per year.

"The ITCs have a history of contributions to the Army capabilities, enhanced effectiveness and interoperability and continue to provide valuable solutions to ongoing needs for minimal costs," Gigrich said.

The battlefield commander wants and needs solutions now Brown said.

The battlefield commander wants and needs solutions now Brown said. "The ITCs review technology abroad in hopes of finding a technology that can be implanted or will enhance current technologies in use or in research that will improve current or future items in development. It is all about locating the best technology for the Soldier and putting it to good use," Brown said.

The Infantry Warrior Simulation (IWARS) advances technology

By Dean Muscietta
U.S. Army Materiel Systems Analysis Activity and Robert Auer
Natick Soldier Center

The Army has long used models and simulation to support materiel acquisition decisions. In recent years, it has become apparent that a robust, Soldier-centric modeling capability is needed to conduct integrated, multi-domain analyses that explore the complex relationships between Soldiers, their equipment, and their battlefield environment. To meet this need, the Natick Soldier Center and the Army Materiel Systems Analysis Activity are collaborating to develop the Infantry Warrior Simulation.

IWARS is an Advanced Technology Objective program to provide a constructive, closed-form, agent-based, high resolution combat simulation to assess the military worth of individual and small-unit dismounted Warfighter equipment. The IWARS ATO is ending the first year of its three-year charter.

IWARS is designed to assess the operational effectiveness achieved by the integration of suites of Soldier equipment across a spectrum of missions, environments, and threats. IWARS analysis output will include standard force-on-force Measures of Effectiveness and Measures of Performance as well as a tailorable capability to track outputs of interest to address unique analysis issues. IWARS is PC based with a modular software architecture to allow for maximum flexibility in implementing study modifications or general upgrades.

IWARS uses Army standard algorithms wherever applicable. These include approved physics-based representations such as target acquisition, target engagement, munition fly out, and munitions effects. Environmental and psycho-physiological elements such as heat stress, fatigue, load, hydration, dynamic weather/terrain, and variable lighting conditions can also be played.

IWARS allows the user to develop scenarios in open terrain, urban areas, and inside buildings. Soldiers are represented by intelligent agents whose knowledge of their environment determines the Soldier's decisions and behaviors. The Soldier's skills and actions are derived from Army field manuals, operational experiments, and military subject matter experts.

IWARS has a multitude of potential uses, to include capability gap analyses; requirements determination studies; system/sub-system technical trade-off analyses; operational testing extrapolation; and doctrine, tactics/techniques/procedures, or basis of issue impact analyses.

While IWARS is a Natick Soldier Center/AMSAA collaboration, the IWARS team interacts with other organizations to leverage complementary efforts, to include the following:

U.S. Army Infantry Center / Soldier Battle Lab, which contributes military expertise, particularly in scenario development and Soldier behaviors.

Army's Focus Area Collaborative Teams (Urban Operations, Soldier; and C4ISR), which develop new algorithms/data to remedy high-priority M&S shortfalls.

PEO Soldier, which identified IWARS as a key component of their M&S strategy in evaluating emerging Soldier systems technologies.

U.S. Marine Corps Combat Development Command and Warfighting Laboratory, which is exploring the adoption of IWARS as an analysis tool and expressed interest in supporting Soldier behavior validation.

The Technical Cooperation Program, which shares Soldier simulation technologies, methodologies, analyses, and data across member countries.

Small Business Initiative Research program, which develops new, cutting edge methodologies to expand simulation capabilities.

IWARS is also collaborating with the COMBATXXI and OneSAF simulation programs. IWARS and COMBATXXI have agreed to link the two simulations to provide a full spectrum representation of the battlefield from individual Soldier to brigade while minimizing duplication of effort. IWARS and OneSAF hold regular technical exchange meetings to support IWARS incorporation of the OneSAF Synthetic Natural Environment and Military Scenario Definition Language. In turn, OneSAF is following IWARS development of Soldier-specific methodologies and detailed Soldier behaviors/data for potential insertion into OneSAF. These collaborations will help establish a level of methodology and data consistency across the Army's three major entity-level combat simulations.

The IWARS Configuration Control Board, jointly chaired by AMSAA and Natick, includes as members the Army Infantry Center, Soldier Battle Lab, PEO-Soldier, TRAC-WSMR, PM-OneSAF and United States Marine Corps. The CCB establishes priorities for each IWARS development phase, reviews simulation verification and validation results of each model version, and recommends IWARS release to selected organizations. This process will continue to leverage the expertise and analysis requirements of the numerous agencies involved with the simulation.

IWARS-Beta is currently undergoing V&V testing at AMSAA. The IWARS V&V will consist of the following testing:

Component-level Testing to verify simulation architecture, physical algorithms, Soldier behaviors, output analysis tools, user interfaces, etc.

Integration-level Testing to determine if all components are interfacing properly

Analysis-level Testing through a series of pilot studies to demonstrate IWARS capabilities.

Given the successful conclusion of the V&V, the CCB will pursue approval for IWARSv1.0 release in early 2006 to address Soldier lethality, survivability, sensor performance, and (limited) situational awareness / battle command analysis applications. IWARS will provide significant dividends to the Army analysis communities and will continue to evolve to address future materiel, organizational, and operational issues associated with the dismounted combatant.

-300 miles in three days
Army showcases hydrogen powered vehicle in California Road Rally

By Thomas Moyer
Research, Development and Engineering Command Public Communications Offfice

Hydrogen-powered fuel cell technologies designed for consumer use, and for U.S. military non-tactical vehicle applications, were showcased by all major U.S. automakers and the U.S. Army Research, Development and Engineering Command, as part of a rolling convoy during the 2005 California Fuel Cell Partnership Road Rally, Sept. 29 – Oct. 1.

The Army's modified Chevrolet Silverado, equipped with two 94-kilowatt fuel cell stacks fueled by compressed hydrogen gas, was showcased throughout the three-day long road rally throughout Northern California. The U.S. Army Research, Development and Engineering Command took delivery of the pick-up truck April 1 from General Motors Corp., and has been running the vehicle through an evaluation period at Fort Belvoir, Va.

"This vehicle has spent the last few months performing civilian-type duty at Fort Belvoir, Va. where Army Soldiers have been evaluating its performance and learning first-hand about hydrogen and fuel cells," said Dr. Richard McClelland, director of the U.S. Army Tank-Automotive Research, Development and Engineering Center.

"Fuel cell vehicles have the potential to support multiple military needs such as increased system efficiency, quality electrical power, and field generated potable water; to name a few. We were proud to have this vehicle in the road rally and look forward to sharing our perspectives on fuel cells," he added.

The modified pick-up truck is capable of generating 188 kW and 317 foot-pounds of torque, or roughly the motor torque generated by GM's 5.3 liter V-8 engine, according to GM. This was the first time the vehicle was driven in California.

The road rally brought many hydrogen fuel cell vehicles, a hydrogen reformer, a mobile hydrogen refueler and numerous other technologies to Sacramento, Davis, Martinez, Berkely, Oakland, San Jose, San Carlos and San Francisco. During the event, the general public was given several opportunities to test-drive these vehicles, watch them refuel and learn about hydrogen production.

The U.S. Army modified Chevrolet Silverado begins the 300-mile journey on the steps of the state capitol building in Sacramento, Calif. Sept. 29.
(Photo by Tom Moyer)

Hydrogen fueling stations like this one at the University of California-Davis, are becoming more common place in the nation's most populous state.

“The California Fuel Cell Partnership Road Rally was a very successful event for the Army. The fuel-cell truck that we entered was a show-piece at almost all events along the tour," said Bill Haris, engineer with the U.S. Army National Automotive Center.

“Many people who saw the truck could more easily identify with it, because it is a pick-up truck unlike the European style of most of the other vehicles showcased,” he said.

Later this year, the truck will be delivered to the U.S. Marine Corps at Camp Pendleton, Calif. for demonstration and evaluation before returning to the Army.

The U.S. Army modified Chevrolet Silverado refuels at the University of California – Davis. The cruising range of the pick-up truck is approximately 125 miles with a potential top speed of 95 mph.

Bill Haris (passenger seat), engineer with the U.S. Army National Automotive Center, explains the features of the Army’s modified Chevrolet Silverado during a ride and drive event at Golden Gate Field in Berkely, Calif. on Sept. 29. The public was invited to test drive the hydrogen fuel cell vehicles at several locations along the route.

ECBC opens Advanced Chemistry Laboratory

Jennifer Gaskill
Edgewood Chemical Biological Center

A facility where defense research with super-toxic chemical warfare agent will be conducted opened Oct. 7 with a dedication ceremony at the Edgewood Chemical Biological Center, Aberdeen Proving Ground, Md.

Installation leaders and state and local officials gathered to dedicate the Advanced Chemistry Laboratory to Dr. Edward J. Poziomek, a former ECBC scientist.

Senator Paul S. Sarbanes presented the Poziomek family with a U.S. flag that had been flown over the Capitol in commemoration of their father's legacy of published and patented chemical agent research that foreshadows the work that will occur in the ACL.

The front of the newly dedicated Advanced Chemistry Laboratory

"Dr. Poziomek was a former ECBC chemist whose dedication to science and commitment to sharing expertise helped position the center as a principal research and development organization," said Dr. Raymond Mackay, director of Research and Technology at ECBC. "He was a mentor, friend and inspiration to everyone."

"The dedication of the ACL marks a major milestone of a new era of cutting-edge science and technology development," said Jim Zarzycki, ECBC technical director. "More now than ever, we are prepared to fulfill our mission of preparing our Warfighter and domestic emergency responders to counter the terrible threat of weapons of mass destruction."

"The cost of $46M for the facility will benefit the nation by increasing the ability for ECBC to better counter the evolving threat of chemical warfare and the use of chemical agents by terrorists," stated Maj. Gen. Roger A. Nadeau, commander of APG and the U.S. Army Research, Development and Engineering Command.

"With our nation at war, up-tempo readiness is of our highest concern." The ACL houses over 20 individual labs specializing in the research of physical properties, decontamination sciences, filtration, mid-spectrum agents, synthesis, and nuclear magnetic resonance.

"I am excited about the new facility in that it will logistically allow us to work closer with scientists just down the hall in a variety of fields that contribute to my research," said ECBC chemist, Dr. Terrence D'Onofrio.

D'Onofrio is studying how chemical agent contamination affects various common surfaces, including asphalt, soil and concrete, in order to develop more accurate detection, protection and decontamination technologies.

Air Force Maj. Gen. Bruce F. Tuxill, (filling in for Robert L. Ehrlich, Jr., (Governor of Maryland), addresses the audience prior to the presentations at the ACL Dedication Ceremony

"The ACL is a completely unique facility designed for working with the world's most super toxic compounds," Zarzycki said. "The ACL moves U.S. defense capabilities a giant step forward. In addition to supporting ECBC's Warfighter

mission, the ACL allows ECBC to continue to serve the homeland security community as well as all federal agencies including the intelligence community, FBI, Department of Justice and the Department of State."

Army Educational Outreach Programs ignite interest in students

By Kim Wilson
Research, Development and Engineering Command Public Communications

Students with the Gems program work on an experiment with ARL. (Archive Photo)

As times rapidly change, so does the demand for advanced science, math and engineering. The Research Development and Engineering Command, Aberdeen, Md., is helping to embrace the future of technology through Army Educational Outreach Programs.

AEOPs are designed to elicit excitement in the areas of science, math, engineering, and technology in students by promoting education in these areas. RDECOM's outreach programs provide valuable experiences for participants, both instructors and students, while allowing them to understand the importance of a future in technology.

"Science and technology has been and continues to be the engine to the economic growth of our society and national security," said Dr. Vallen L. Emery Jr., outreach program manager, RDECOM.

Recent studies show that the number of U.S. students interested in pursuing a career in math and science are at an all time low, therefore, measures are being taken to raise the interest of research and development. RDECOM outreach challenges two trends within the U.S. science and engineering workforce: global competition for science and engineering talent that impacts the pool of international science and engineering workforces, and the decline of native-born science and engineering graduates entering the workforce, Emery said.

An important factor in AEOPs is minority outreach, in which Dr. Robin L. Keesee, deputy to the commander, RDECOM, said he strongly believes in. He attends job fairs to excite minority students about a future in technology. He has worked with the National Society of Black Engineers, the Society of Hispanic Professional Engineers, and the Society of Women Engineers.

"A minority outreach program provides us the opportunity to build ethnic diversity in our work force so that it more fairly represents society," Keesee said.

"You have to have a work force that mirrors the population," Emery said and added that in the near future, the current minority population of society will be the majority. Emery also noted that the U.S. Army Materiel Command, RDECOM's higher headquarters, recently received an award from the Department of Defense and the Department of the Army's Office of Small and Disadvantaged Business Utilization for the Best Major Army command Historically Black Colleges and Universities/Minority Institutions program, in part for the efforts RDECOM put forth towards minority outreach programs.

In just over a year, RDECOM has made great strides in the outcome of outreach initiatives. The command already accomplished major goals including: elevating programs from Army Research Laboratory and placing it as a RDECOM responsibility, thus increasing the minority outreach effort, and hiring new engineers as a result, Keesee said.

AEOPs aim to encourage students from kindergarten through graduate school to take part in science, math, engineering and technology education, and to participate in Army science, math and engineering programs.

The Educational Outreach Strategy is “a cohesive strategy to engage youth, as well as teachers,” Emery stated. The approach seeks to “introduce, excite, engage and graduate” participants.

Beginning in grades kindergarten through six, students are offered one-on-one academic support and career path guidance through mentoring and tutorial programs. The importance of math and science in future careers are conveyed through presentations and are reinforced through guidance and tutorial sessions. These programs also encourage future participation in AEOPs.

Educational Outreach students study their experiment during the summer at the Army Research Laboratory. (Archive photo)

After initial introduction to programs students are urged to participate in eCybermission. A web based science, math and technology competition for students nationwide in grades six through nine that address the national decline in science and math test scores. Kelly Stratchko, program manager, ARL noted that the program has grown from 1,583 participants to 6,886 in three years.

eCYBERMISSION challenges students to solve problems creatively by using science and math in the areas of sports and recreation, arts and entertainment, environment, or health and safety, according to the official website. Some unique examples from www.eCybermission.com include: “how would you make high performance basketball shoes,” or “do you have ideas on how to make your little brother’s playground safer?” Some children found ways to help their community while participating in eCYBERMISSION.

“There were two serious accidents in our community that really hit home and we wanted to do something to help,” said Becca Hoy, a seventh grader on the LifeSavers team. The WB LifeSavers, the team Hoy was on, sought to increase education, training and awareness about the hazards of rural roads, in an effort to reduce the number of teenage driving accidents in their community.

Top awards for winning regional and national teams include a top prize of $8,000 savings bonds and trips to Washington, D.C. to attend the national judging and educational event.

“eCYBERMISSION is a great opportunity to work together. Each member of the team is like a puzzle piece and together we can accomplish anything,” said Alex Leith, an eCYBERMISSION participant.

`The Educational Outreach Strategy offers eight AEOPs for students in grades eight through twelve. The Gains in the Education of Mathematics and Science Program, Research and Engineering Apprenticeship Program, Science and Engineering Apprentice Program, Uninitiates Introduction to Engineering Program, Materials World Modules Program, Junior Science and Humanities Symposia, International Mathematics Olympiad, and International Science and Engineering Program provide laboratory internships and competitions promoting conduct of original research.

GEMS is a four -week summer program that provides high school students paid internship opportunities in a teaching laboratory, stressing scientific and mathematical skills. Students who participated at Aberdeen Proving Ground, Md. completed projects such as 3-D animation and interactive website design and exploratory data analysis.

REAP invites historically underrepresented high school students to participate as a summer apprentice in a summer work study and research program. The program is administered by the Academy of Applied Sciences and enables students to receive hands-on training in research and development.

The SEAP program is an eight week summer apprenticeship that provides hands-on learning activities and student mentor relationships encouraging careers in Science and Engineering.

UNITE is also a summer program, that encourages students to pursue a college education in engineering and prepares them by allowing them to attend classes on college campuses. The program parallels an academic experience of a first year college student. UNITE is available on seven campus locations.

eCYBERMISSION students work on a project during their visit to Washington D.C.

(Archive photo)

MWM was designed for students in grades nine through twelve but can be adjusted to the middle school level (six through eight). MWM uses materials science, the study of the characteristics and uses of various materials, to widen the talent pool for math, science, and engineering.

“Not only does it teach students, but teachers as well,” Emery said. “It’s a way to teach teachers how to adapt to changing teaching methods to suit diverse subject matter.”

Students are encouraged to “study the natural world, formulating researchable questions, designing and conducting scientific investigations, and offering explanations and models based on their findings,” according to the official website, www.materialsworldmodules.org.

JSHS offers students in grades nine through twelve who have conducted original research in science, engineering or mathematics an opportunity to share their work by inviting them to apply to their regional symposium. The official website, www.JSHS.org, indicates that this program aspires to increase the pool of educated professionals equipped to conduct research and development vital to our nation.

“The program promotes individual and independent research in which the students conduct research and present their findings in a seminar format,” said Peggy Lacewell, Program Specialist Youth Science Activities, U.S. Army Research Office.

Regional and National finalists are publicly recognized for outstanding achievement at the regional symposium and may be awarded governments scholarships and all-expense-paid trips to the National Symposium and the London International Youth Science Forum.

AEOPs geared towards the collegiate level allow students laboratory experiences that promote career opportunities. RDECOM’s five programs: the Faculty Research and Engineering Program, Career Related Experience in Science and Technology Program, Reserve Officers Training Corp, Science and Technology Academic Recognition System, and Educational Partnership Agreement take place within government laboratories, academia or industries.

FREP is intended for faculty members from universities. Faculty members gain valuable experience working with scientists and engineers in research laboratories during the summer time or up to 60 days in one year.

CREST offers summer and part time employment that can lead to an appointment of civilian engineer or scientist positions for qualified students in the Army Intern Program.

ROTC provides an internship to chosen cadets at Army organizations following a commitment to summer military camps and school obligations.

STARS recruits exceptional students who are enrolled in a science, engineering, or mathematics program at Historically Black Colleges or Universities and/or other minority institutions and offers tuition assistance and paid-internships as they progress professionally within the ARL workforce.

EPA is a partnership between ARL and universities promoting curriculum development, faculty and students development and research and development opportunities at Army facilities.

Through outreach efforts, RDECOM is able to ignite enthusiasm in students of all ages, teaching them the importance of technology in our society.

“These programs, although different in concept, have the same purpose,” said Lacewell. “…Encourage students to consider science, mathematics, engineering, and technology as possible career choices. For more information about RDECOM Educational Outreach Programs, go to www.rdecom.army.mil and click on Educational Outreach Programs.

(Editor’s note: Wilson is a college intern with the RDECOM public communications office)

ARL donates school supplies to local schools

By Stephany Jaramillo
Army Research Laboratory Public Affairs

When school opened this year in Prince George's County, Md.; more than 2100 school supply items donated by Army Research Laboratory employees were delivered to Beltsville Elementary School.

Items ranging from rainbow colored crayons and black ink pens to boxes of tissues for stuffy noses were transported by an ARL motor pool van to needy students. They were also given a supply of protractors and pencils. Monetary contributions, to pay fees for children who would otherwise not be able to participate in school activities, accompanied the school supplies.

The swings in the school yard emptied as boys and girls ran to help carry the donated school supplies into the classrooms. The generosity of ARL civilian and military personnel brought smiles to the faces of those children who might have possibly begun this new school year without the proper tools required to successfully tackle the challenges ahead.

Fifth graders from Sue Carmichael's class at Beltsville Elementary School hold up a sign showing their appreciation for Army Research Laboratory's school supply donations. From left, Carlos Melendez, Sam Ellison, Casey Gray and Zanae Nash.
(Courtesy photo)

The school supplies were left in collection boxes located at the Adelphi Laboratory Center in Adelphi, Md. Daily, the boxes were emptied for delivery to schools in the neighboring Adelphi community. One ARL employee wrote out a check for $100. She said her children, now adults, had attended Beltsville Elementary School.

Although the sign the students displayed to ARL personnel delivering supplies to the school said "Thank You" in English, the sounds of "Gracias" in Spanish; "Dzie Kuje" in Polish; "Merci Beaucoup" in French; "Arigato" in Japanese; "Dhanyavaad" in Hindi; "Asante" in Swahili and "Peshto" in Afganastan could also be heard from both students and their appreciative parents living in the culturally diverse community of Beltsville.

Joseph A. Lannon named new ARDEC director

Picatinny Public Affairs Office

Dr. Joseph A. Lannon

Dr. Joseph A. Lannon was named director of the Armament Research, Development and Engineering Center here Wednesday by Maj. Gen. Roger A. Nadeau, commanding general of the center's headquarters, the U.S. Army Research, Development and Engineering Command, Aberdeen Proving Ground, Md.

"We look forward to the proven leadership that Dr. Lannon will bring in directing the ARDEC to the new horizons so vital to our Nation and the day-to-day mission accomplishment of our War Fighters around the world," Nadeau said.

Lannon is a member of the senior executive service, the highest level of federal government service.

He completed his thirty-ninth year with the federal government in 2005.

His most recent position was senior technical executive of the Armaments Engineering and Technology Center where he led a technical organization of approximately 1,800 scientists, engineers and administrative employees who develop technologies for future armaments programs.

Lannon has held a variety of research, development, engineering and management positions prior to being appointed AETC's top civilian executive.

He earned a Bachelor of Science Degree in Chemistry at St. Joseph's University and a Doctor of Philosophy Degree in Physical Chemistry at the University of Pennsylvania.

Throughout his career, the new ARDEC director has played a major role in developing innovative technologies and the world-class facilities, equipment and employees necessary to execute the Army's armaments programs.

He succeeds Michael Devine who retired in 2004.

For more information contact the U.S. Army Research Development and Engineering Command at (410) 436-4345.

Copycat ACUs not up to Army Standards

There are three civilian companies that are producing Army Combat Uniforms not to Army Standard. The Army has copyright and is not allowing civilian companies to produce the Army Authorized NSN approved stock type ACU. These civilian companies are producing ACUs that are off shade to the Army authorized ACU.

There are three main ways to tell the Civilian vs. Army versions:

Company one produces a dark green Velcro zipper.

Company two produces ACU with no pleat in the back of the coat.

Company three produces ACUs with no tab on sleeves, tan zipper and trousers don't have draw string in cargo pocket and a few other items.

In addition, they are producing T-shirts as well which are slightly off color of the ACU shade. All of these civilian stock numbers are one or two numbers off from Army Auth NSN.

The official Army version of the ACU will go on sale beginning April 2006. Necessary steps should be made to ensure Soldiers aren't wasting their money on the unauthorized uniforms.

Detroit students recognized for Achievements in national science, math and technology competition

Students from Durfee Elementary School were recognized recently for their regional and national accomplishments in science, math and technology in the U.S. Army's 2004-2005 eCYBERMISSION competition.

Two teams of students were presented with awards and savings bonds in a lively ceremony that featured representatives from the U.S. Army Research, Development and Engineering Command, the Junior Reserve Officer Training Corps Color Guard, and Drill Team and members of the Central High School marching band. Members of the Wayne County School Board were also in attendance to congratulate the Detroit winners.

"The Durfee Boys" were named eighth grade 1st Place Regional Winners from the Northwest Region and one of 16 National Finalist teams. For their project, the students tested the use of flashing arm-bands for pedestrians in an effort to prevent traffic fatalities in Detroit, where pedestrian fatalities are highest in the nation. The team included Darion Hill-Austin, DeAundre Graves, Demontae Moore, and Koreco Wilkins, and Greg Chappelle, who served as the team's advisor. For their achievements, each member of the team received $6,500 in savings bonds.

**Winning students from Durfee Elementary School pose for a phot after being handed a total of $34,000 in savings baonds from eCYBERMISSION.
(Courtesy photo.)**

The "Rhythm and Soul" team, sixth graders also from Durfee Elementary School, received a "Benefit to the Community" award for raising awareness on the effects of popularizing drug use on television, movies, and in popular music. The team created a song on this important topic, which they sang at the ceremony. The students included Deonta Bray, Shaquilmiah Hagwood, Shaquille Pitchford, and Dawnyel Lundy, and Allecia Gates, who served as the team's advisor. Each member of the team received $2,000 in savings bonds.

eCYBERMISSION is a web-based science, math and technology competition that allows students in grades six through nine to compete for regional and national awards, while working to solve problems in their community. A total of 1,151 teams submitted projects in the 2004-2005 eCYBERMISSION competition, totaling 4,184 students from across the country and in Department of Defense Education Activity schools worldwide.

Registration for the 2005-2006 eCYBERMISSION competition is opened Sept. 1, and runs through Dec. 12. For additional information, visit www.ecybermission.com.